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star first studied systematically by Sir WILLIAM HERSCHEL, and from which he concluded that there are systems of visual binary stars, in which the two components are revolving around their common center of mass.

The number of spectroscopic binaries thus far discovered with the Mills spectrograph, and announced, is fifty-eight, not counting those (five) found by the D. O. Mills Expedition to Chile, nor the three found by Dr. R. H. CURTISS with the one-prism spectrograph.
W. W. CAMPBELL.

THE COMETS OF THE YEAR 1904.

Five comets were discovered in the year 1904, two of which were the periodic comets known as Encke's and Tempel$_2$. The former is too near the Sun at present for observation, but it is hoped that further measures may be secured later on.

Of the three unexpected comets of the year, one (Comet *a* 1904) was discovered in America, the other two in Europe. Comet *a* has been described in earlier number of these *Publications,* and it is only necessary to add that it is still well placed for observation, and, judging from two observations made this month with the 12-inch telescope, will remain visible in large telescopes for several months longer.

Comet *d* was discovered by M. GIACOBINI, at Nice, on December 17, 1904. It is very small and faint, and as it is receding both from the Earth and the Sun, will soon become a very difficult object. From my observations of December 19 and 27, 1904, and January 9, 1905, I have computed the following set of elements for this comet:—

$$\begin{array}{rl}
T = & 1904 \text{ November } 3.2272 \text{ Gr. M. T.}\\
\begin{array}{r}\omega =\\ \Omega =\\ i =\end{array} & \left.\begin{array}{rrl}40^\circ & 42' & 34''.8\\ 218 & 28 & 04\ .5\\ 99 & 36 & 41\ .2\end{array}\right\}\ 1905.0\\
\log q = & 0.274540
\end{array}$$

Residuals for the middle place (O – C) :—

$$\Delta\lambda' \cos\beta' = +3''.3;\ \Delta\beta' = -3''.8$$

The ephemeris, to March 6, 1905, may be found in *L. O. Bulletin,* No. 67.

The last comet of the year was discovered by M. BORRELLY, at Marseilles, on December 28, 1904. It is brighter than

Giacobini's comet, but, like the latter, has passed perihelion, and is receding from the Earth. It is not likely, therefore, to remain visible very long.

R. G. Aitken.

January 24, 1905.

Note on Two Interesting Binaries in *Cetus*.

The star *Ceti* 82, was found to be a close double star by Burnham in 1875, but no accurate measures were made until 1886. The observed motion in the next five years was very slow, but that the pair would ultimately prove to be an interesting physical system was evident from the large proper motion common to the two components—about 1″.4 annually in the direction 90°.

The star was not observed from 1891 to 1897, but in the latter year See measured it and found a remarkable change.

The companion-star was now in the fourth quadrant instead of the second, and less than half as far from its primary as in 1891. Dr. See computed an orbit and found a period of only 16.3 years, but the observational data were at that time insufficient for accurate conclusions, and later measures have indicated a very different orbit. I have followed this pair regularly since 1897, and with the aid of the additional data thus secured have now computed an orbit which will, I hope, at least approximate the truth. The details of this computation will be printed as one of the *Bulletins* of the Lick Observatory; it will therefore be sufficient here to give the mean of my most recent observations and the elements of the computed orbit. The mean of two measures in December is:—

1904.96 332°.8 0″.20

And the elements are:—

$P = 24.0$ years $\qquad \Omega = 110^\circ.8$
$T = 1899.7$ $\qquad \omega = 159.4$
$e = 0.15$ $\qquad i = \pm 76.65$
$a = 0''.66$ $\qquad \mu = +15.00$

Apparent motion direct.

Another interesting binary in this constellation is 13 *Ceti*. This star has had a peculiar history. In 1877 Burnham catalogued a distant companion, but saw nothing unusual about the bright star. In 1886, however, Hough, with the same tele-